

ENEMATA*

FROM THE ANATOMICAL AND PHYSIOLOGICAL STANDPOINTS

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IN reviewing the anatomy of the colon let us study first the ascending portion. At its beginning is the sacculated pouch, the cecum. Entering the upper left margin of the cecum is the ileum, guarded by the ileocecal valve which transmits contents in but one direction. The sacculated portion of the cecum is slightly longer, slightly more pouched on the lateral than on the medial side. Attached to what originally was the apex of these sacculae is the vermiform appendix. The ascending colon narrows as it comes to the hepatic flexure. Here it is held by a short mesentery. The excursion of this angulation, the hepatic flexure, is very slight as compared with the mobility permissible by the longer mesentery of the ascending colon. The hepatic flexure forms an angle, somewhat more than a right angle, because of the hammock formation of the transverse colon with its long, free mesentery swinging across to the higher splenic flexure. The mesentery of the transverse colon is longer than any other portion, allowing free excursions of the transverse colon several inches upward, downward, or sideways.

The splenic flexure is located in the upper left abdominal quadrant. At this point the mesentery attaches the colon fixedly to the posterior abdominal wall.

As we look into the fully exposed abdominal cavity the short omental attachment at the hepatic and splenic flexures gives the transverse colon the appearance of a hammock swung from two posts, the left much higher than the right. The splenic flexure forms an angle between the transverse and descending colon, practically refolding upon itself.

Here the character of the bowel changes in caliber and in musculature. Its lumen becomes smaller, its musculature much more developed and powerful. The descending colon is held rigidly to the posterior abdominal wall. In caliber it looks about the size of the ileum. This short mesentery follows the descending colon down to the sigmoid flexure, where there is a bit more freedom allowed. The same type of musculature and the same caliber prevail in the sigmoid, but as the sigmoid dips back to the fourth sacral vertebra the mesentery is so short that no freedom of motion is allowed and the sacculated muscular pouch with absence of striations forms the last four or five inches of the colonic tract.

We have, therefore, a muscular tube with distinct divisions. The sacculated portions are the

cecum and the ascending colon, the transverse colon, and the rectum. The transverse colon is trapped on each end by the flexures and is immobile at those points. The descending colon, of strong musculature, is held immobile by a short mesentery. The rectum is a dilated reservoir with strong musculature. The strongest muscle of the colon is strategically so placed as to carry along by its peristaltic contractions the more compact residue of the products of digestion.

POSTOPERATIVE ENEMATA

Following operation we have a slight atony of the entire voluntary muscular system as we likewise have of the involuntary. On the first, second or third days, postoperative, the surgeon finds that the bowels have not reestablished their action. He writes for a soapsuds enema which is administered by the nurse with the patient lying upon the back. Two quarts or more are given. This great volume of water rises in the colon, dilating the rectum, sigmoid, descending colon, rounds the curve of the splenic flexure and, because of its volume, straightens out the curves and allows its passage. On it flows through the hammock of the transverse colon distending and ballooning it out. It rounds the curve of the hepatic flexure and fills to distention the ascending colon and cecum. It can go no farther. The ileocecal valve stands guard. This inflow of an irritating fluid has been against the peristaltic waves, reversing the normal current in the entire colon. It has ballooned and placed upon overdistention the very musculature whose aid is desired.

We are all familiar with what overstretching of muscle does—the subsequent relaxation, the subsequent atony and slowness in regaining tone. How frequently the nurse records upon the chart that the enema did not return, and was siphoned off. The overdistended colon, with paralyzed peristaltic waves which might expel the enema, has been defeated in its normal function.

RADIOGRAPHIC PICTURE OF ENEMA

Now let us find out what proportion of an enema is really evacuated by the patient and, if not all is evacuated, where is it pocketed? The radiographer will tell you that he frequently gives a barium enema, and as he watches the flow up the colonic avenue it hesitates in the sigmoid as the ascending enema straightens out the curves in its upward progress. Again hesitation is seen at the splenic flexure while this straightens to allow passage. Similar action takes place at the hepatic flexure and when this flexure has been straightened the enema fills to ballooning the three sacculated portions of the bowel. How much is evacuated with the bowel movement? Films taken after evacuation show that much is securely trapped in the cecum and ascending colon, and in the transverse colon.

I have described the ileocecal valve as the guard placed in the cecum to allow transmission only in one direction, that is downward. In the radio-

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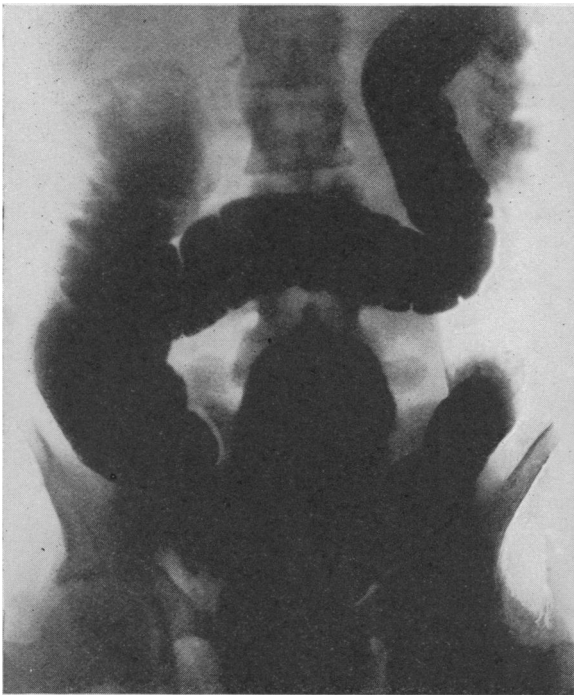


Fig. 1.—A barium enema of two quarts which was given to a normal individual who had never before been given an enema.

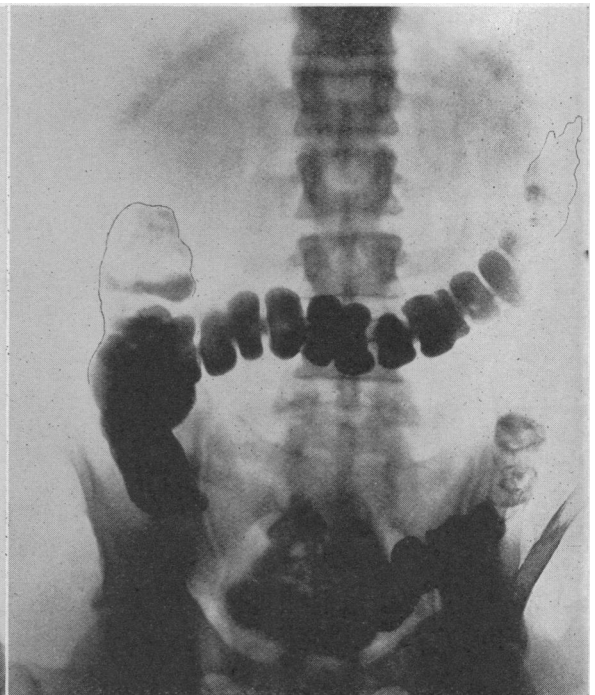


Fig. 2.—This film was taken immediately after spontaneous evacuation of the enema by the normal individual who had never before had an enema (Fig. 1). It shows the residue unexpelled. Observe that the major portion is pocketed behind the splenic and hepatic flexures.

graphs of Case 1739 the barium enema is clearly shown backing up into the ileum (Fig. 3). Therefore we must conclude that the overstretching and relaxation of the ascending colon has destroyed the function of the valve, so permitting the fluid to flood back into the ileum. If it were intended that the contents of the colon should back up into the ileum, carrying therein debris and putrefying

bacteria, no valve would have been placed there. To the frequent enema taker this performance of continually reinfecting the ileum must be a factor in ileocolitis. Dr. Roland S. Cummings, in a recent paper on constipation, has described the reverse peristaltic ripples established in the colon which may continue on back through the entire gastro-intestinal tract. He even states that

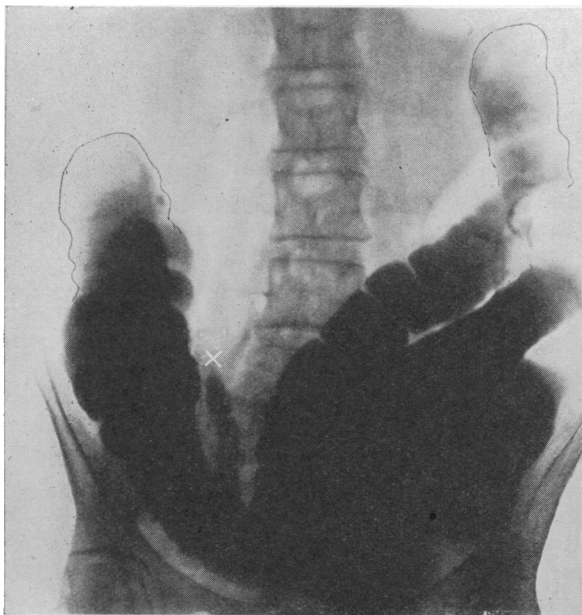


Fig. 3 (Case No. 1739).—This film is of a barium enema given to a patient who is a daily enema user. Observe that the enema is backed up in the ileum at the point marked X.

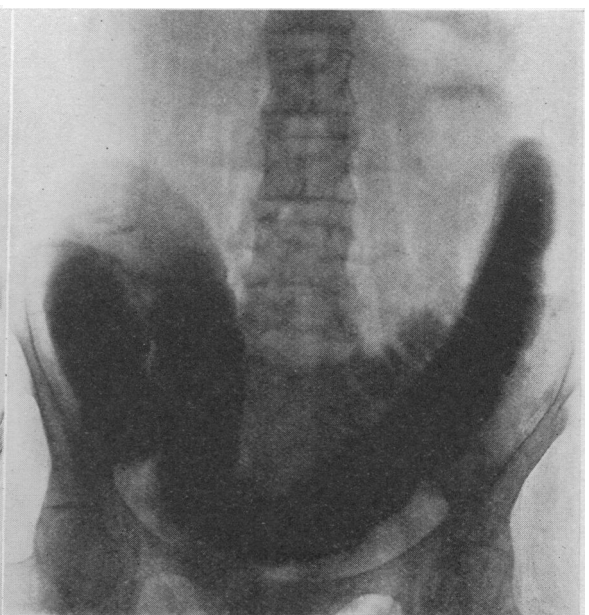


Fig. 4.—Immediately after spontaneous evacuation of the barium enema (Fig. 3), showing the major portion pocketed behind the splenic and hepatic flexures.



Fig. 5.—Demonstrating a rectal tube, thirty inches long, rolled up in the rectum and sigmoid.

lycopodium dusted over the anal orifice has been found in the buccal cavity the following morning. How contrary, then, to the normal peristaltic waves is this column of fluid rising in the colon!

We routinely request diagnosis with the barium enema. When I ask how many studies are made after the first evacuation of the enema the answer is, with a look of surprise, "Why, we never take any pictures at that time!" Yet when films so taken are studied, it is seen that the major portion of the enema remains and that gaseous dilatation in the three great balloons prolongs the overstretching about which I have spoken.

Here we have this great volume of water of the enema continually distending and thereby destroying the muscle tone we are so anxious to reestablish. Our patient says: "Doctor, I feel miserable, have a headache, my bowels aren't moving." The doctor orders an enema at once. It is given, the headache disappears, the temperature drops, the patient sleeps. What has happened? The temperature of the fluid of the enema has been below the patient's temperature. Two quarts of this cold fluid have been poured into the bowels and much absorption into the circulation occurs. The headache is relieved. Certainly it is. It is relieved by rapid absorption of the fluid into the dehydrated tissues. The shock of the enema and the need of the blood to warm the cold water has caused a cerebral anemia, therefore the headache is diminished. But the establishment of the normal function of the bowel has been damaged and by frequent repetition may be permanently damaged. We have the chronic enema takers with us always, those who have no normal bowel movements because they wash out

the mass which the muscle would normally contract upon and they balloon the musculature until its contractility is permanently destroyed.

SURGEON'S RESPONSIBILITY AFTER OPERATION

The purpose of surgery should not be to "cut and tie" only. We should in every way aim to reestablish the normal function of the bowel. To accomplish this there are two essentials: stimulation of the muscle of the bowel with small enemas or suppositories, combined with stimulating catharsis; and provision of a bulky mass in the rectum by feeding bran, agar or vegetables that leave a residue of a semisolid consistency. These should supplant entirely the copious, distending enemas.

In reviewing a series of major operations performed within the last few months, I have selected the last fifty successive case records for analysis. Of this number, nine reestablished bowel function without an enema or cathartic and forty reestablished normal bowel function by stimulating enemas of milk and molasses combined with administration of mineral oil. In twenty instances only, one milk and molasses enema was given, in thirteen two were given, five patients required three, and one had six before normal bowel action was reestablished. One patient of this series died with peritonitis from a ruptured, gangrenous appendix. To this patient two milk and molasses enemas had been administered, and could in no way contribute as a cause of death.

For a long time I had great difficulty in preventing nurses administering enemas to my patients without a written order. It seems that the general impression made on the nurse's mind is that if a patient's bowels do not move a soap-suds enema is in order without direction from the doctor in charge. It seems to me that the written direction for such procedure is just as essential as the order for diet or medication and that it should be absolutely against the hospital rules for a nurse to proceed undirected.



Fig. 6.—Demonstrating the difference in the caliber of the transverse colon and the descending colon. The strongest muscle of the gastro-intestinal tract is located in the descending colon and is so strategically placed, for heavy duty.

To the minds of the layman, the nurse, and often of the doctor, the term "high enema" implies the introduction of a long colonic tube. The accompanying illustration presents an x-ray film with thirty inches of tube coiled in the rectum and sigmoid. This was not done as a trick illustration. The tube was introduced in the routine manner with the patient on his back. Practically no distress was experienced by the patient, which substantiates the fact that the passing of a long rectal tube through the sigmoid is a most difficult procedure.

Nowhere in nature do we find an enema rock or an enema tree. The fountain syringe and the irrigating bag are strictly the development of civilization, and are sold by expert advertising. In this promotion the rubber goods manufacturers are aided and abetted by some unsuspecting doctors.

CONCLUSIONS

1. Voluminous enemas destroy muscle tone.
2. Voluminous enemas destroy the function of the ileocecal valve.
3. Voluminous enemas are pocketed and retained behind the splenic and hepatic flexures.
4. The so-called "high enema" is a misnomer and is dangerous.
5. Enemizing is important treatment and should be prescribed and regulated by the doctor.

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DISCUSSION

CHARLES S. JAMES, M. D. (820 Westlake Professional Building, Los Angeles).—It is a well recognized fact in discussing the anatomy, physiology or pathology of the intestinal tract that it should be clearly defined which animal group is being considered as the herbivorous, carnivorous, or omnivorous because of the wide anatomical and physiologic variations.

This paper is a very timely one as a plea for our greater care against the abuse of, but not the use of, enemas, stressing as it does the futility and even possible danger of the voluminous enema.

The old views of "high and low enemas" are without anatomical or physiological basis, for fluids, when introduced into the rectum, are carried rather rapidly to the ileocecal valve, aided by the reversed currents of Bond; hence there is no indication for the use of the long rectal tube with its incidental rectal coiling, and all enemas are "high enemas."

Coiling of the tube, perforation or injury to the rectum, is prevented by not introducing the rectal tube more than ten to fifteen centimeters (four to six inches). It is seldom that one can introduce a tube beyond the valves of Houston without a proctoscope or other aid.

From a surgical viewpoint, enemas should be avoided during the first two weeks after suture of the colon, and large enemas, two to four liters, have caused intraperitoneal leakage and peritonitis from the giving way of an appendiceal stump, a necrotic area of the bowel, or of an intestinal suture line, even a week or ten days after operation.

In recent years there has been a great deal of investigation, observation, and study in the effort to secure a better understanding of the movements, functions, and physiological relationship of the colon, resulting in a marked advance in our sum of knowledge pertaining thereto; however, it has been revealed that there is a wide variation of opinion by the various investigators and there remains a broad field for further investigation before we can accept as factual many of the present-day theories.

The colon presents many factors different from the preceding small intestine. Its movement may be of a mixing or segmental type, in the ascending colon a reverse retarding movement may be noted evidently that the absorption condenser function may be favored, or that peristalsis may be of either the progressive wave type or rush mass type.

Gravity probably plays but little part in the progress of material through the colon, and gastro-enterologists are paying less attention to the position of the colon, especially the transverse loop, and it has been shown by Moody and Chamberlain, in a study of six hundred normal students, that the transverse colon was found so frequently situated in the pelvis that this position must be accepted as a normal one.

The intricate nerve supply of the colon would indicate a greater importance than we now accord it. The division of the gastro-intestinal tract, according to its innervation, corresponds roughly to the embryological differentiation and we note, according to Brown and Fraser, that the anterior segment has both motor and inhibitory impulses transmitted by the vagus; the middle segment is supplied by the sympathetics (inhibitory) and the parasympathetics (motor) from the thoracic and superior mesenteric plexuses; the posterior segment is more complex in that both inhibitory and motor impulses supplying the proximal portion of the large intestine are conducted by the sympathetic system through the inferior mesenteric plexus; the distal portion is supplied by motor nerves from the lumbosacral plexus, and the rectum by both the parasympathetic and sympathetic nerves from the pelvic plexus.

It would appear that the medical profession have as yet many unsolved complex problems before they attain a practical understanding of colonic dysfunction with its multivariad clinical sequela.

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WILLIAM H. DANIEL, M. D. (802 Pacific Mutual Building, Los Angeles).—Doctor Lewis has presented a very important and practical subject. The enema habit has become more vicious than the cathartic habit, especially since the advent of the commercial establishments.

He has shown the capacity of the colon, the anatomical points of arrest of the fecal current, especially in the sigmoid flexure, as it lies low in the pelvis. Associated with this latter condition is frequently a looseness or prolapse of the sigmoid and of the rectal mucosa, which when pressed upon by a large amount of fluid from above offers a greater obstruction to the outward flow.

The majority of enemas are given without any physiological or clinical reasons excepting that the bowels have not moved. The causes of constipation, as rectal pathology causing the gastro-intestinal tract and pelvic organs, usually have not been considered.

Repeated overdistention of the bowel causes a loss of tone with impairment of the nervous mechanism. The use of large amounts removes the natural lubricating mucus, thus increasing or prolonging constipation. To the actual damage done must be added the neglect of the offending rectal pathology and the increasing irritation caused by improper treatment.

It is my opinion that 90 per cent of all colon flushings are given or ordered without scientific reason and that enemas rarely, if ever, cure constipation. There are a few cases of specific ulcerations in which irrigations are helpful.

Soap should never be used as it causes a marked proctitis. Enema tubes should always be of soft rubber and of small caliber with rounded ends, and should be inserted, whenever possible, with the patient in the lateral position.

In the surgical cases the effect of trauma must be considered and the bowel function should be allowed to recover as far as possible in a natural manner.